



Virtual Public Workshop Plan & Procedures

Tonight's virtual public workshop will operate similarly to an in-person meeting, and will be recorded.

Public Workshop Procedures:

- The workshop will begin with a brief presentation followed by an opportunity for attendees to ask MDOT MAA questions about the study.
- To ask a question:
 - Use the "Raised Hand" feature on the screen and an administrator will unmute your microphone, or
 - You can ask (type) the question in the chat box
- We will take questions this evening until 6:55 p.m.
- If you experience technical difficulties:
 - Please let us know in the chat box
 - Log off, and log back in
 - We recommend having only one web browser open for the duration of the meeting, and to close all other programs on your computer, if possible.





Agenda

- MDOT MAA Introduction
- Public Workshop
 - Presentation
 - Q&A
- Break
- Public Hearing (7PM-8PM)





Maryland Airport Noise Zone (ANZ) Regulations

- Maryland Environmental Noise Act of 1974
 - Intended to minimize aircraft noise impacts and prevent incompatible land development around airports
- Code of Maryland Regulations (COMAR) requires MDOT MAA to complete an ANZ update for BWI Marshall every five years
- Noise impact determined by Day-Night Average (DNL/Ldn) composite contours:
 - Base year
 - 5-year post certification forecast
 - 10-year post certification forecast
- The ANZ represents the largest extent of the annual contours for each study year





ANZ Update Scope and Process

- Establish Stakeholder Advisory Committee (SAC)
- Prepare base year, 5-year, 10-year forecast contours
- Compile composite Airport Noise Zone (ANZ)
- Prepare inventory of existing land use
- Update the Noise Abatement Plan
- Obtain approval from MAC to circulate proposed ANZ Update
- Conduct public workshop/hearing
- Submit final ANZ to MAC for approval and MDOT MAA Executive Director certification







Completed

Airport Noise Zone (ANZ) Study Update Elements

| Airport Noise Zone (ANZ) | Noise Abatement Plan (NAP) |
|--|---|
| Means to identify and control incompatible land development around BWI Marshall | Prescribes measures to monitor and reduce or eliminate impacted land use areas to the extent feasible, while maintaining efficient airport operations |
| Comprised of the largest extent of the annual Day-Night Average (DNL/Ldn) composite contours for each study year (2020 base, 2025 and 2030 forecast) | |



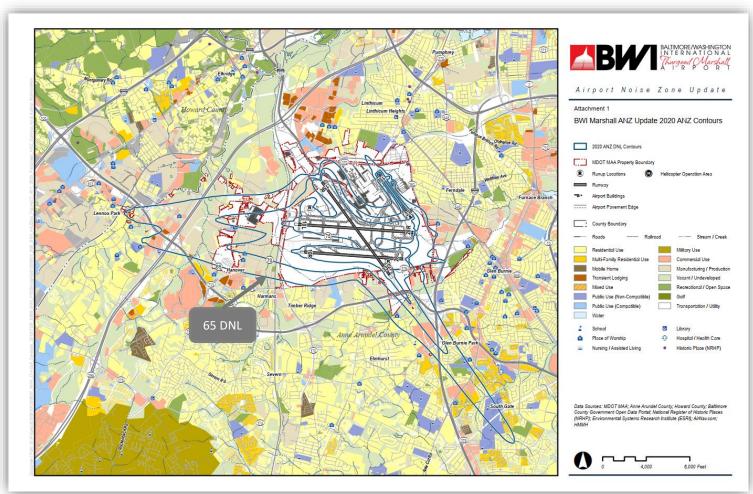


Stakeholder Advisory Committee (SAC) Roles and Responsibilities

- The SAC serves in an advisory role to the MDOT MAA solely for purposes of the BWI Marshall ANZ update process
 - Review of study inputs, assumptions, analyses, documentation, etc.
 - Input, advice, and guidance related to Noise Abatement Plan
- SAC members are expected to provide two-way communication between the SAC and their organizations / constituents
- MDOT MAA shall respect and consider SAC input, but retains overall responsibility for the BWI Marshall ANZ update



2020 BWI Marshall ANZ Contours



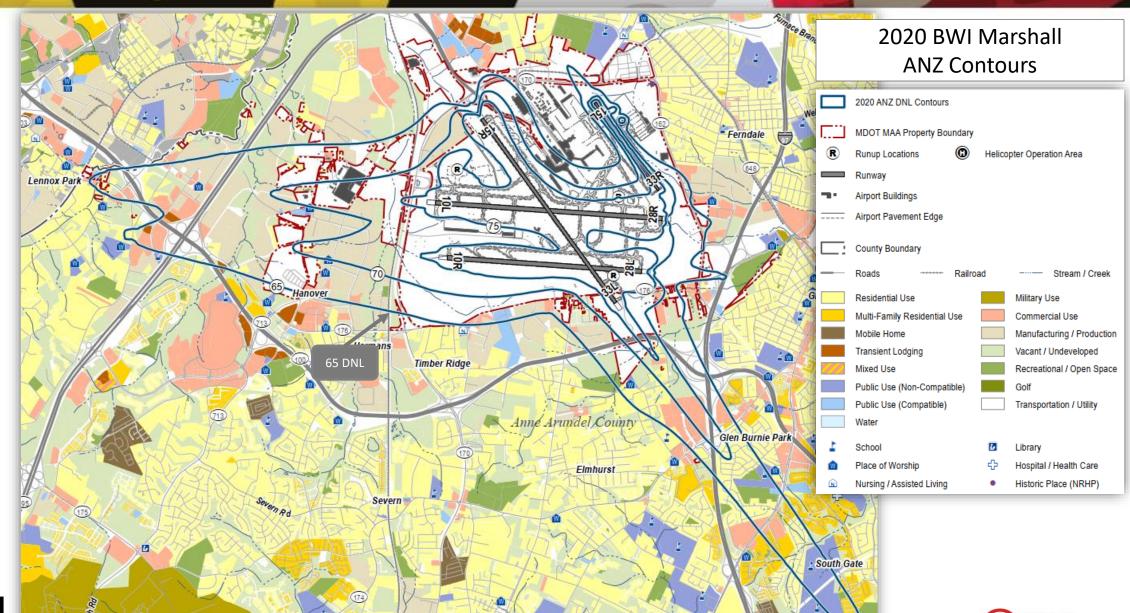
Composite noise contours modeled for existing (2020) and future (2025 and 2030) scenarios

2020 ANZ: 5,543 acres (8.6 square miles)

• 53% on MDOT MAA property



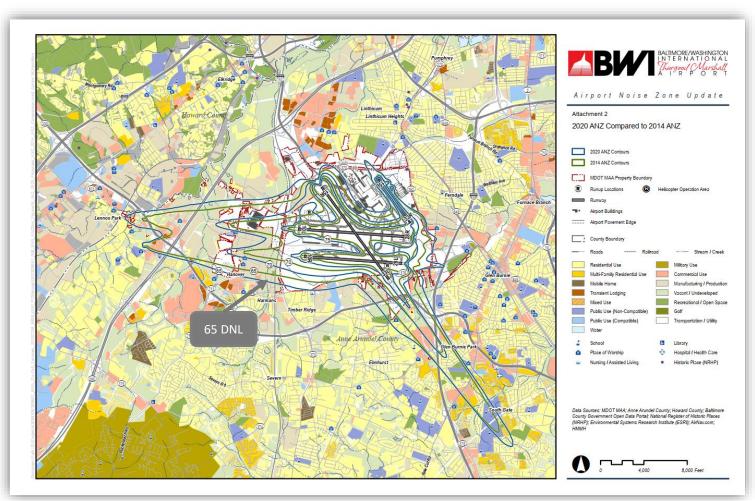








Comparison of 2020 ANZ to 2014 ANZ



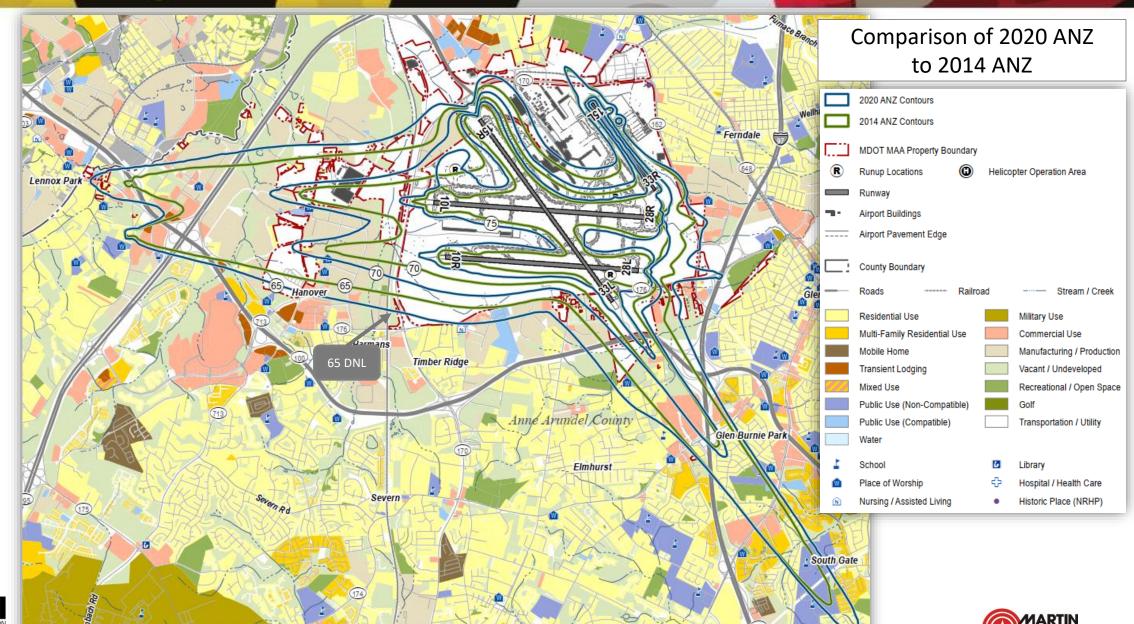
2020 ANZ is 23% larger than 2014 ANZ

Changes attributable to:

- Shift in the day/night distribution of operations toward nighttime hours,
- Changes in the aircraft fleet mix,
- Differences in number of operations,
- Increases in aircraft maintenance runups,
- Changes in flight tracks modeled associated with the construction of a new parallel Runway 10R/28L,
- Noise model updates





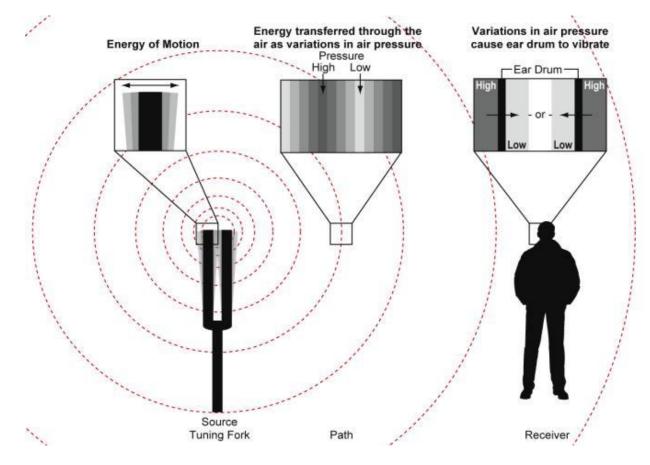






Noise Fundamentals: Sound vs. Noise

- Sound is pressure variation our ears can detect
 - An objective quantity
- Noise is "unwanted sound"
 - A subjective quantity
- We relate sound and noise by considering effects
 - Annoyance
 - Speech interference
 - Sleep disruption







Noise Fundamentals: The Decibel Scale

- We use a logarithmic scale decibels, or dB to express sound levels and noise levels
- Why?
 - We hear sound pressures over a HUGE range
 - Decibels compress this range to match the way we interpret sound pressures
 - 0 to 140 dB
 - -00000003 to -03 lbs. per sq. inch (psi)
 - We "hear" in decibels.

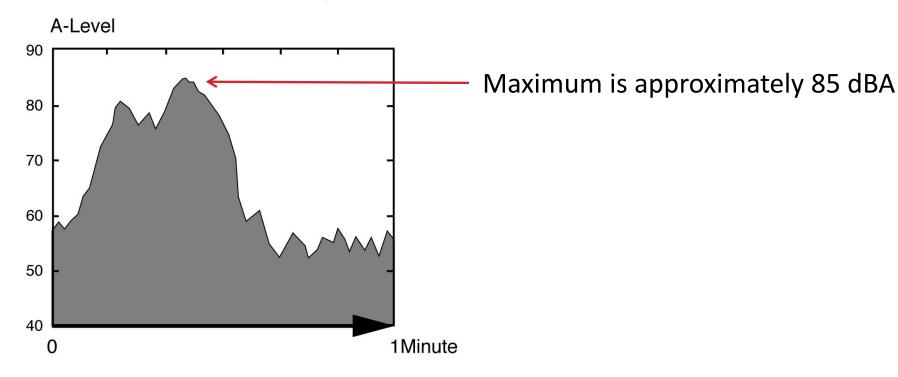
| "Energy" | dB | Common sounds | |
|---------------------|-----|---------------------------------------|--|
| 100,000,000,000,000 | 140 | Near a jet engine at start of takeoff | |
| 10,000,000,000,000 | 130 | Threshold of pain | |
| 1,000,000,000,000 | 120 | On stage at a loud rock concert | |
| 100,000,000,000 | 110 | | |
| 10,000,000,000 | 100 | Jack hammer at 6 feet | |
| 1,000,000,000 | 90 | | |
| 100,000,000 | 80 | Vacuum cleaner at user's ear | |
| 10,000,000 | 70 | Vacuum cleaner at 10 feet | |
| 1,000,000 | 60 | Normal speech | |
| 100,000 | 50 | | |
| 10,000 | 40 | Quiet residential area | |
| 1,000 | 30 | | |
| 100 | 20 | Whisper | |
| 10 | 10 | | |
| 1 | 0 | Threshold of hearing | |
| 0.1 | -10 | | |





Noise Fundamentals: Single Event Noise Metrics

 The simplest way to describe a discrete noise "event" is its maximum sound level, abbreviated as Lmax

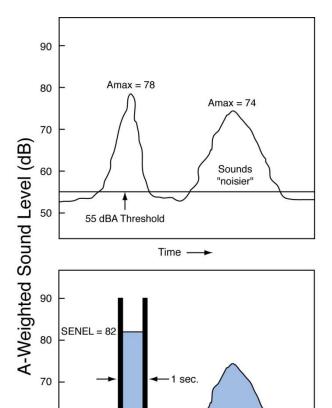


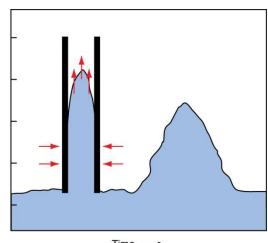


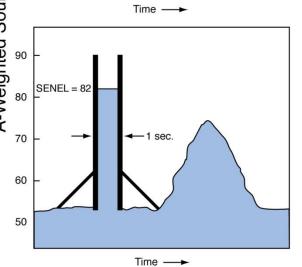


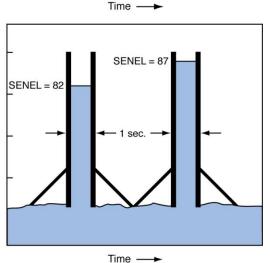
Noise Fundamentals: Single Event Noise Metrics

- Sound Exposure Level (SEL) measures the total "noisiness" of an event by taking duration into account
- Duration matters: A longer event may seem "noisier," even if it has a lower or equal maximum level









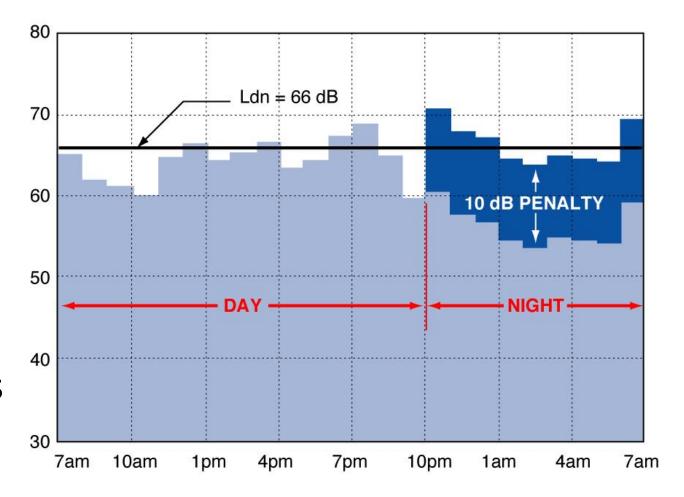




Noise Fundamentals: Cumulative Exposure Metric

Day-Night Average Level (DNL)

- Describes 24-hour exposure
- Noise from 10 pm to 7 am is factored up by 10 dB
 - "Penalty" is equal to counting each night aircraft 10 times
- DNL is abbreviated as Ldn (as defined in COMAR)







COMAR Requires Modeling

- Sec. 11.03.03.02.
 - §C. Development of noise contours of equal noise exposure are to be determined using a prediction method in accordance with the procedures of §D, below. Measurements, undertaken in accordance with the procedure of §E of this regulation, may be used to confirm the locations of contours of equal noise exposure.

Source: http://www.dsd.state.md.us/comar/comarhtml/11/11.03.03.02.htm





Measured v. Modeled

Three reasons why measured noise data (permanent or portable noise monitors) cannot be used for creating DNL contours (and why noise models are used):

- 1. Measured noise levels can contain non-aircraft noise sources
- 2. It is impossible to measure at enough locations to draw contours from the results. Modeling calculates DNL for a full year's airport operations at every point in a very precise grid
- 3. Measured noise levels cannot be used to predict future noise levels





Noise Modeling Process

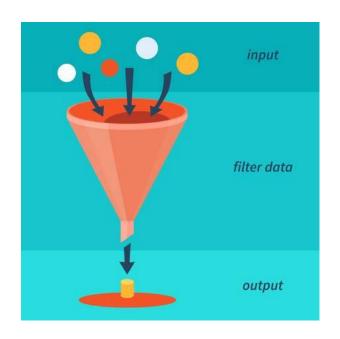
- Study years for this ANZ Update: 2020, 2025, 2030
- First step, analyzed existing radar data
- Base Year (2020)
 - Utilized a 12-month set of flight tracks from September 2018-September 2019 from MDOT MAA Airport Noise and Operations Monitoring System (ANOMS)
 - Determined base year AEDT inputs
 - Developed base year conditions and DNL/Ldn contours
- Forecast Years (2025 and 2030)
 - Determined 5 and 10-year forecast AEDT inputs
 - Use of existing MDOT MAA and FAA forecasts to determine future levels of operations and fleet mix
 - Anticipated changes to airport layout and associated flight track changes
 - Developed 5-year and 10-year forecast DNL/Ldn Contours





Noise Model Inputs

- Aviation Environmental Design Tool (AEDT)- noise modeling software
- AEDT requires input data in three categories:
 - 1. Aircraft noise and performance data
 - 2. Airport physical inputs
 - 3. Aircraft operational data
 - Number of aircraft operations
 - Aircraft fleet mix
 - Day-night split of operations
 - Runway utilization
 - Flight track geometry and utilization







Physical Input Requirements

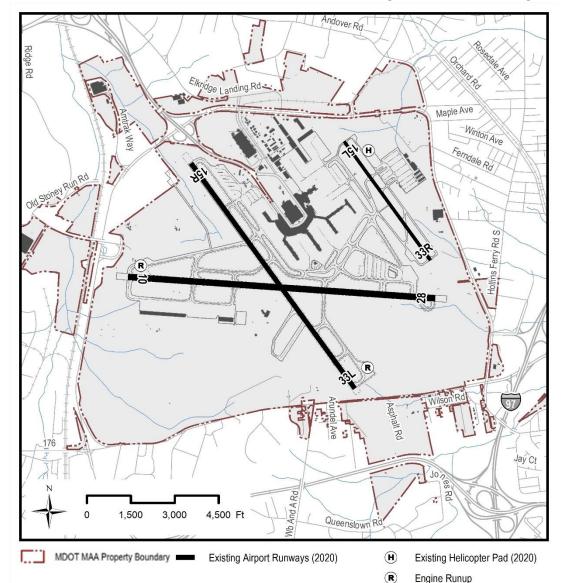
- Runway layout (including displaced landing or takeoff thresholds)
- Flight tracks
- Airport elevation
- Airport weather
 - Temperature
 - Relative humidity
- Related requirements:
 - runway use rates
 - flight track use rates







Base Year (2020) – Airport Layout







Base Year (2020) Operations

- Overall operations levels derived from 2019 edition of FAA Terminal Area Forecast (TAF)
 - FAA TAF is in terms of fiscal year (October
 September) where ANZ update in terms of calendar year (January –December)
 - Operations from FAA TAF years 2020 and 2021 adjusted to reflect calendar year to establish base year (2020) ANZ operations levels
- Aircraft fleet-mix, runway use, and flight tracks derived from ANOMS
- Aircraft maintenance runups derived from MDOT MAA runup logs

| Operations Category | Count of Operations | Percentage of Operations | |
|--------------------------|---------------------|--------------------------|--|
| Air Carrier (AC) | 229,296 | 84% | |
| Air Taxi (AT) | 31,714 | 12% | |
| General Aviation (GA) | 12,266 | 4% | |
| Military (ML) | 1,166 | 0% | |
| Total | 274,442 | 100% | |
| Average Annual Day (AAD) | 751.9 | | |

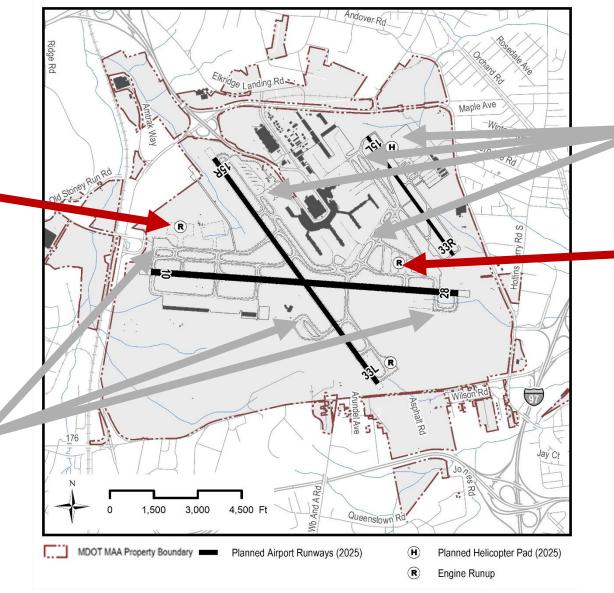




Five-year Forecast (2025) – Airport Layout

Airline maintenance facility and runup location

Taxiway improvements (not modeled)



Taxiway and ramp Improvements (not modeled)

De-Ice pad improvements and runup location





Five-year Forecast (2025) Operations

- Overall operations levels derived from FAA Terminal Area Forecast (TAF)
- Operations fleet-mix, runups, and runway use derived from existing MDOT MAA and FAA forecasts
 - Updated Draft Environmental
 Assessment and Draft Section 4(f)
 Determination, ALP Phase I
 Improvements at BWI Marshall Airport,
 February 2020
- Flight tracks are the same as base year (2020) operations

| Operations Category | Count of Operations | Percentage of Operations | Percentage Change from 2020 |
|--------------------------|---------------------------|--------------------------------|-----------------------------------|
| Air Carrier (AC) | 251,673 | 86% | +10% |
| Air Taxi (AT) | 25,946 | 9% | -18% |
| General Aviation (GA) | 12,361 | 4% | +1% |
| Military (ML) | 1,166 | 0% | +/-0% |
| Total | 291,145 | 100% | +6% |
| Average Annual Day (AAD) | 797.7 | | |

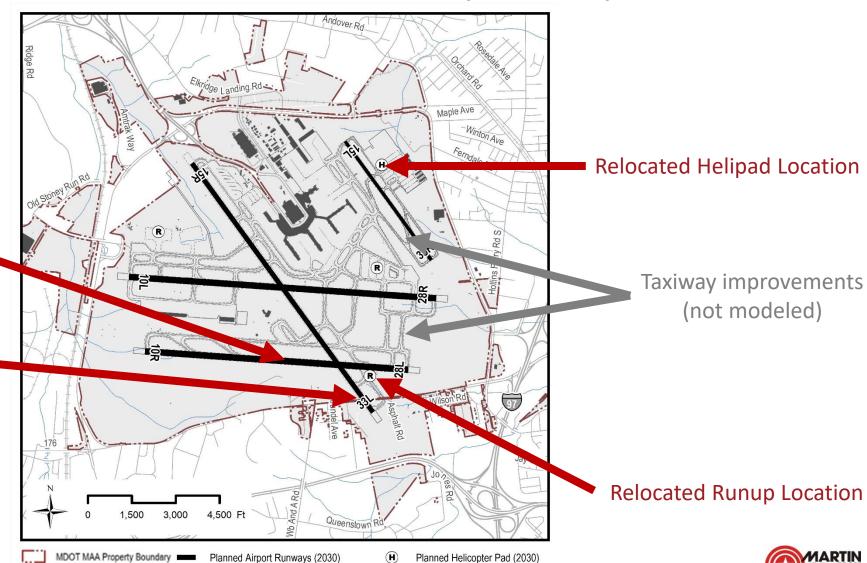




Ten-year Forecast (2030) – Airport Layout

New parallel Runway 10R/28L and associated Taxiways

Extension of
Runway 15R/33L and
associated taxiway modifications



Engine Runup



Ten-year Forecast (2030) Operations

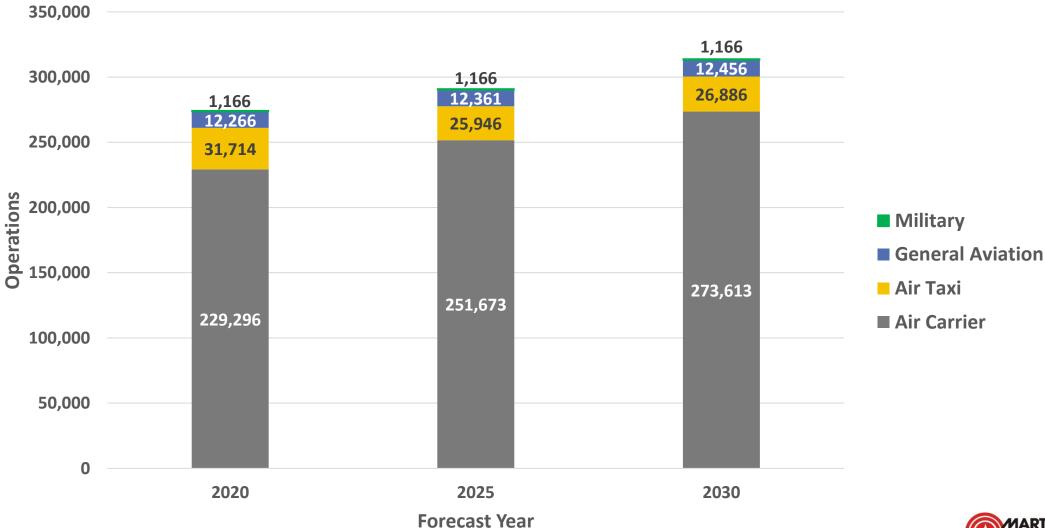
- Overall operations levels derived from FAA Terminal Area Forecast (TAF)
- Operations fleet-mix and runups derived from existing MDOT MAA and FAA forecasts consistent with methodology for five-year (2025) forecast

| Operations Category | Count of Operations | Percentage of Operations | Percentage Change from 2020 |
|--------------------------|---------------------------|--------------------------------|-----------------------------------|
| Air Carrier (AC) | 273,613 | 87% | +19% |
| Air Taxi (AT) | 26,886 | 9% | -15% |
| General Aviation (GA) | 12,456 | 4% | +2% |
| Military (ML) | 1,166 | 0% | +/-0% |
| Total | 314,121 | 100% | +15% |
| Average Annual Day (AAD) | | 860.6 | |



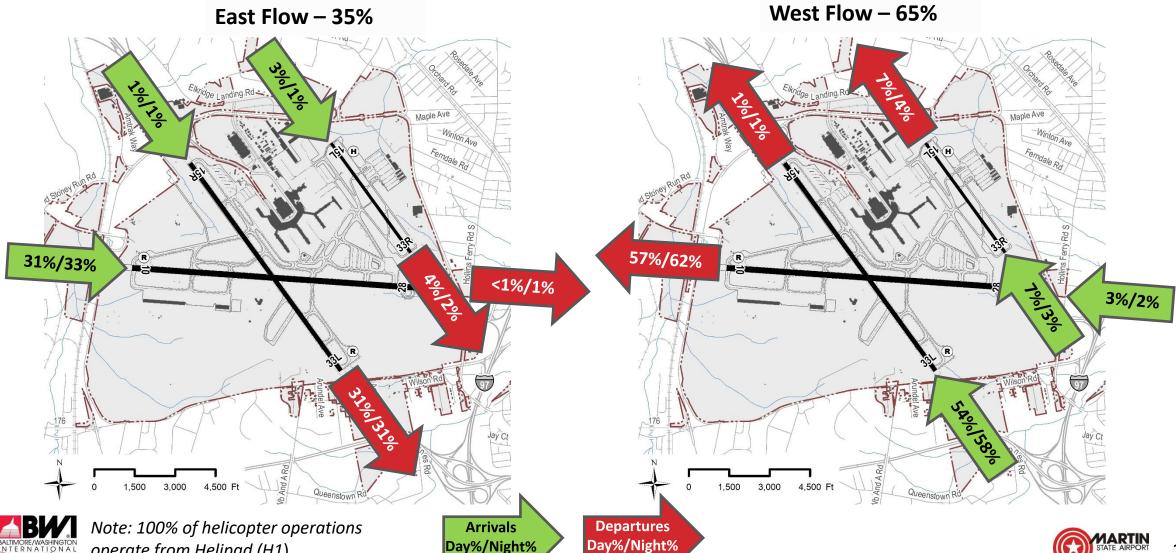


Comparison of Forecast Operations



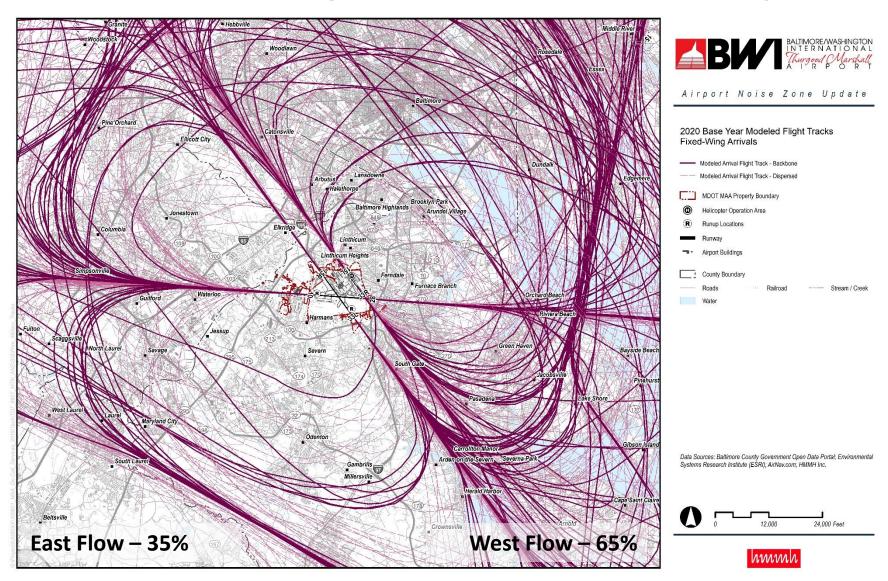


Overall Base Year (2020) - Runway Utilization



operate from Helipad (H1)

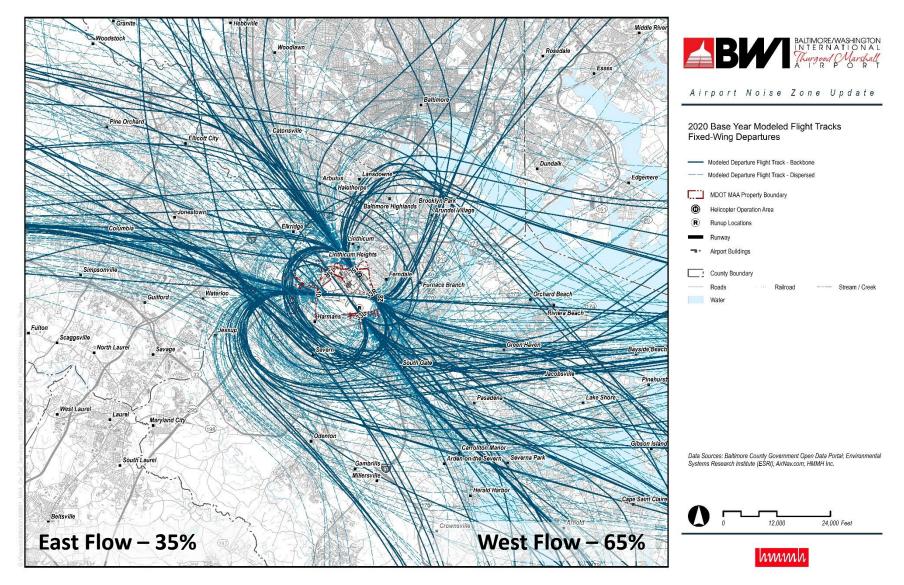
Base Year (2020) Flight Tracks – Fixed-Wing Arrivals







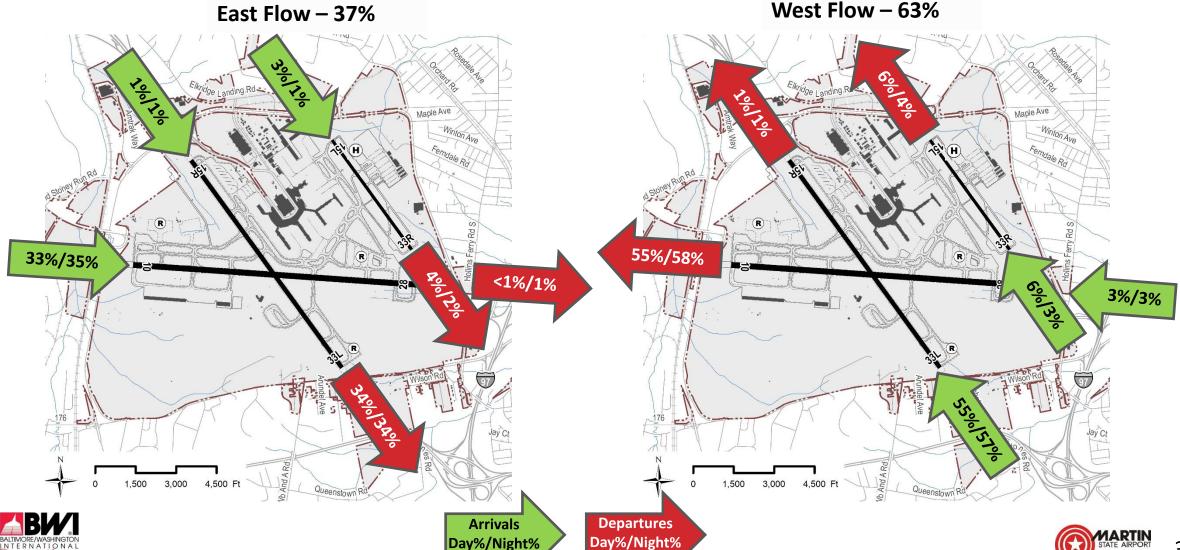
Base Year (2020) Flight Tracks – Fixed-Wing Departures



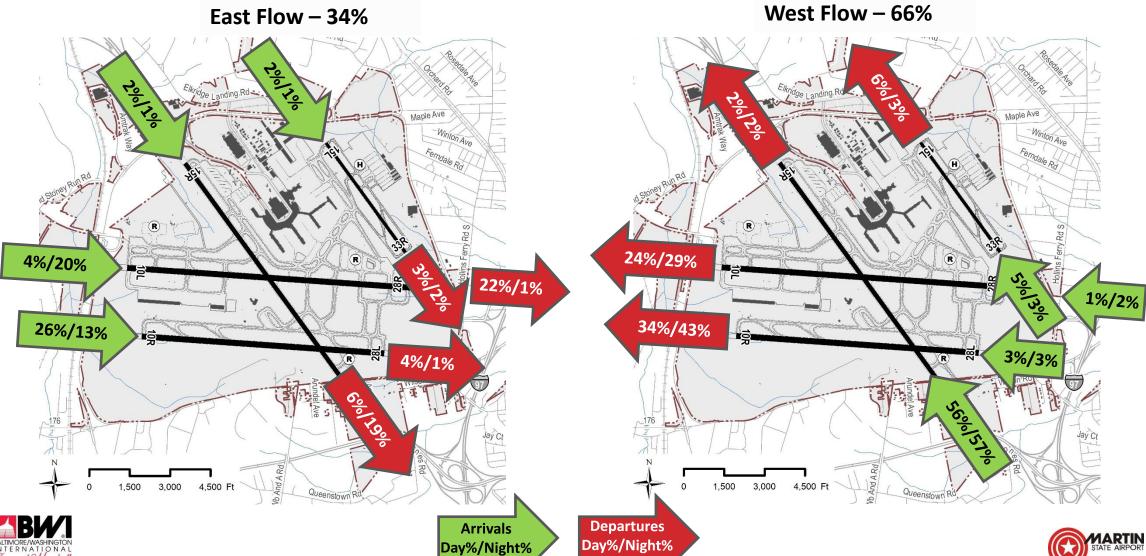




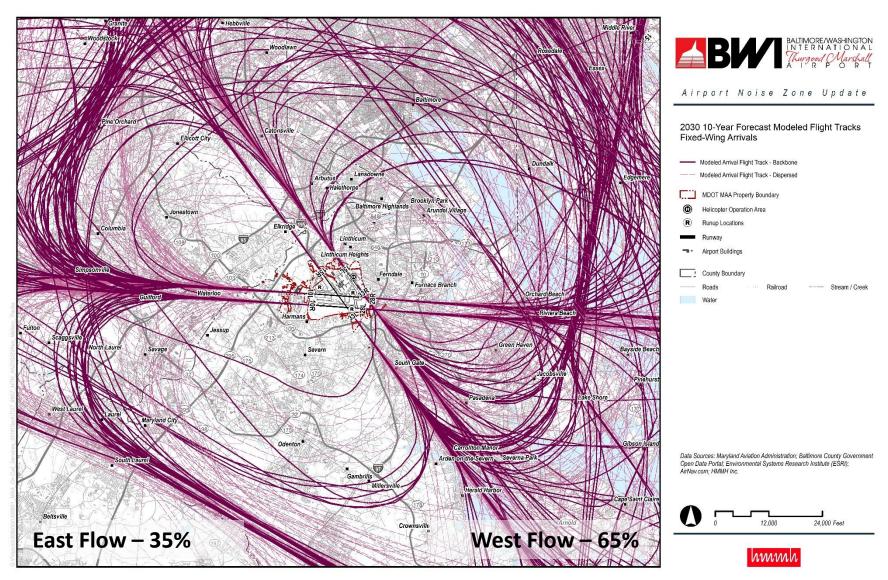
Overall Five-year Forecast (2025) – Runway Utilization



Overall Ten-year Forecast (2030) – Runway Utilization



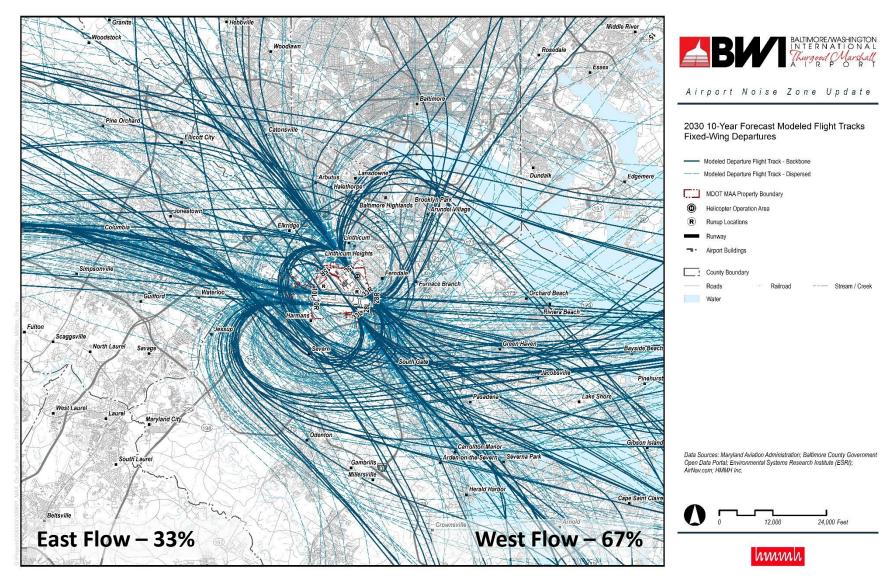
Ten-year (2030) Forecast Flight Tracks – Fixed-Wing Arrivals







Ten-year (2030) Forecast Flight Tracks – Fixed-Wing Departures







BWI Marshall NAP Background - Overview

- BWI Marshall's original Noise Abatement Plan (NAP) was developed with the cooperation of airport users, the aviation industry, FAA, communities, and local governments
- The NAP has two general categories:
 - Noise Abatement Elements
 - Strategies intended to reduce noise impacts for communities around the airport
 - Voluntary operational procedures such as control of ground-based noise sources, arrival and departure flight procedures, and a preferential runway use system
 - Land Use Elements
 - Summarizes the means of controlling and mitigating noise-sensitive development within the ANZ (Airport Zoning Permit approval or denial, appeals process, Residential Sound Insulation Program)



BWI Marshall NAP Review - Scope

- Noise abatement procedures are voluntary:
 - The FAA has primary responsibility for implementation of flight procedures and the preferential runway use system at BWI Marshall
 - Aircraft may not follow noise abatement procedures if deemed necessary by Air Traffic Control (ATC) or flight crews to maintain operational safety
- The FAA has introduced new navigation technology and procedures that in some cases deviates from the historic noise abatement procedures



Updated Noise Abatement Plan Summary

Noise Abatement Elements

- Aircraft Noise Abatement Departure Procedures
 - Noise abatement flight tracks for jet and propeller aircraft, which specify turn locations, for each runway based on aircraft type
- Aircraft Noise Abatement Arrival Procedures
 - Visual approach/VFR jet noise abatement arrival procedures
- Preferential Runway Use System
 - West flow operations are preferred for noise abatement
 - For noise abatement, Runway 28 is the preferred runway for departures, and Runway 33L the preferred runway for arrivals (2300 – 0500)
 - Limitations on the use of Runway 33R for departures and Runway 15L for arrivals (2300 0500)
 - Practice landings and approaches by Jet and turboprop aircraft are prohibited on all runways (2300 to 0700)
 - Noise Rule for Runway 15L/33R (prohibits certain louder aircraft from using Runway 15L/33R)
- Control of Ground Based Noise Sources
 - Powerback Restrictions
 - Engine Maintenance Runup Restrictions
- Continued Monitoring
 - Noise Hotline
 - Quarterly Report
 - o Airport Noise and Operations Monitoring System

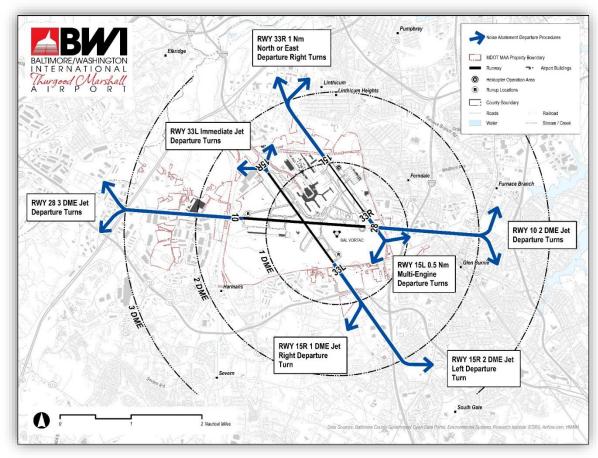
Land Use Elements

- Control of Incompatible Development
 - Airport Noise Zone
 - Board of Airport Zoning Appeals (BAZA)
 - Noise Zone Notification in Real Estate Transactions
- Noise Assistance Programs
 - Homeowners Assistance Program (Residential Sound Insulation Program, RSIP)
 - Voluntary Residential Property Acquisition Program





Noise Abatement Departure Procedures



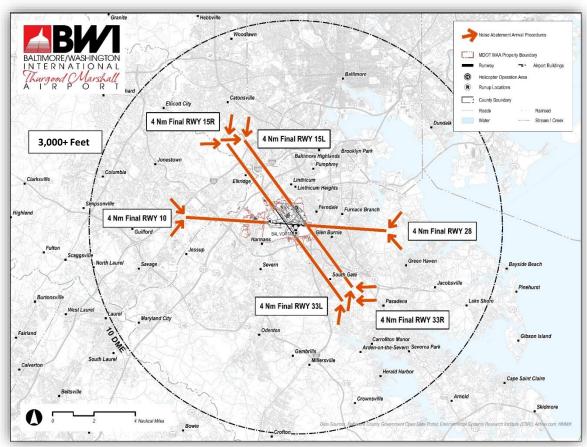
Noise abatement departure flight tracks specify turn locations for each runway based on aircraft type

- a) Jet aircraft should commence departure turns for noise abatement utilizing specific distances based on either Distance Measuring Equipment (DME) from the BWI VHF Omni-directional Range Tactical Air Navigation (VORTAC), if equipped, or a distance from the departure end of the runway to reduce overflights over noise sensitive areas:
 - a. Runway 15R Two (2) DME, or 1.7 nautical miles (Nm) from the departure end of the runway, when turning left, and one (1) DME, or 0.7 Nm from the departure end of the runway when turning right.
 - b. Runway 28 Three (3) DME or 1.7 Nm from the departure end of the runway for all turns.
 - c. Runway 10 Two (2) DME or 1.6 Nm from the departure end of the runway for all turns.
- b) Jet aircraft departures from Runway 33L will begin turns immediately upon becoming safely airborne, but not below 300 feet Above Ground Level (AGL) during Visual Flight Rules (VFR) conditions and not below 400 feet AGL during Instrument Flight Rules (IFR) conditions.
- c) All aircraft departing Runway 33R to the north or east will maintain runway heading until one (1) Nm from the departure end of the runway before turning.
- d) Multi-engine aircraft departing Runway 15L will maintain runway heading until 00.5 Nm from the departure end of the runway before turning.





Noise Abatement Arrival Procedures



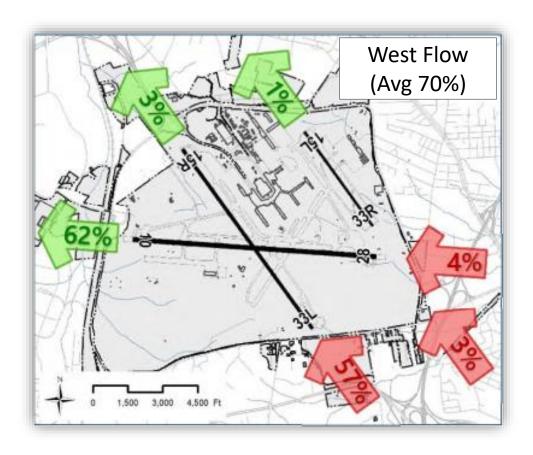
Jet aircraft conducting VFR approaches turn onto final approach minimum of four miles from runway end when traffic conditions permit

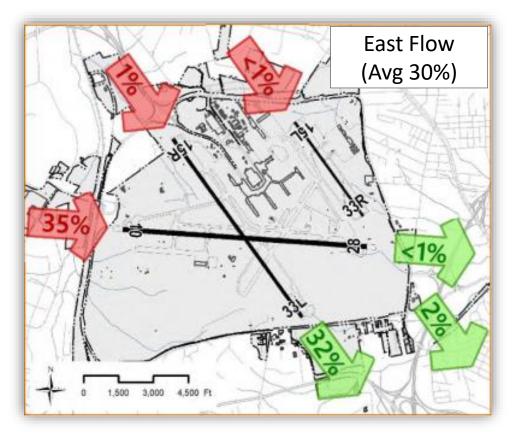
- Jet aircraft conducting visual approaches will turn onto final approach a minimum of four (4) Nm from the approach end of the runway.
- All jet aircraft conducting visual approaches are expected to maintain 3,000 feet or above until 10 DME from the BWIVORTAC and, to the maximum extent possible, should remain at or above the Instrument Landing System (ILS) or Visual Approach Slope Indicator (VASI) for the landing runway, consistent with safe flight procedures.
- When authorized by ATC, the Interstate Visual Runway 33L procedure is to be used by jet aircraft arriving on visual approaches from the south/southwest to Runway 33L. (This procedure provides aircraft a visual approach over I-97 and Route 3.)





Preferential West Flow Operations





West flow operations are preferred for noise abatement. Runway 28 is the preferred runway for departures, and Runway 33L the preferred runway for arrivals (2300 – 0500)





Control of Incompatible Development

Airport Noise Zone (ANZ)

- Anyone desiring to construct or modify a structure or establish land use within the ANZ is required to first obtain an airport zoning permit from MDOT MAA
- MDOT MAA is required by law to approve or deny zoning permits based on the location relative to the BWI Marshall ANZ

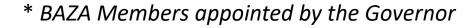
Board of Airport Zoning Appeals (BAZA)*

- If airport zoning permit is denied, applicant may appeal to the Board of Airport Zoning Appeals (BAZA) for a variance from the noise regulations
- In granting a variance to the regulations, the Board will require compliance with all applicable minimum standards of noise attenuation adopted by the MDOT MAA and an avigation easement over the property

Noise Zone Identification in Real Estate Transactions

 A notification process by owners/Realtors to inform prospective buyers of a property's potential location within the BWI Marshall ANZ







Public Notice and Review

Proposed Action (updating COMAR) was published in advance in the Maryland Register.

Public notice was provided via posting in:

- Baltimore Sun
- Howard County Times
- The Capital
- Maryland Gazette

SAC members and Maryland State and Local elected officials were notified directly.

Document is available for public review electronically at MDOT MAA Community Relations website: www.maacommunityrelations.com

Public Comments

- During the Public Hearing each individual will be allocated two minutes to make a comment.
- Written statements, in lieu of or in addition to an oral comment at the hearing, may be submitted to Mr. Bruce Rineer at BRineer@bwiairport.com until 5:00 p.m. on February 14, 2021.





QUESTIONS AND ANSWERS





BREAK

PUBLIC HEARING WILL BEGIN AT 7:00 PM





Virtual Public Hearing Plan & Procedures

Tonight's virtual public hearing will be recorded.

Public Hearing Procedures:

- At 7:00 pm, the MDOT MAA Hearing Officer will formally begin the Public Hearing.
- During the hearing, comments will be heard and recorded, however comments/questions will not be responded to during the hearing.
- To make an official comment, please raise your hand virtually. Commenters will be called upon to speak in the order that hands are raised. Each commenter will be allotted two minutes to speak.
- During the Public Hearing, a Court Reporter will record all public comments.
- Following each comment, the Hearing Officer will thank the speaker and the next commenter will be called.

If you experience technical difficulties:

- Please let us know in the chat box
- Log off, and log back in
- We recommend having only one web browser open for the duration of the meeting, and to close all other programs on your computer, if possible.





PUBLIC HEARING (COMMENTS LIMITED TO TWO MINUTES PER PARTICIPANT)



